CLAIMS:

1. An optical scanning device for scanning an information layer of an optical record carrier, the device comprising a radiation source for generating a radiation beam and an objective system for converging the radiation beam on the information layer, the information layer being covered by a transparent layer of thickness $t_d$ and refractive index $n_d$, the objective system being characterised in comprising a lens formed of a single material, the lens satisfying the condition:

$$0.8 < \frac{t}{1.18 - 2.28\left[FWD + \frac{t_d}{n_d}\right]} < 1.2$$

where t is the thickness of the lens, FWD is the free working distance between the lens and the carrier, where t, $t_d$ and FWD are expressed in millimetres, and where $FWD+t_d/n_d<0.51$.

2. A device as claimed in claim 1, wherein the lens satisfies the condition:

$$0.9 < \frac{t}{1.18 - 2.28\left[FWD + \frac{t_d}{n_d}\right]} < 1.1$$

3. A device as claimed in claim 1, wherein the refractive index n of the objective lens satisfies the condition:

$$-0.1 < n - 2.49 + 2.79\left(\frac{FWD + \frac{t_d}{n_d}}{F}\right) - 2.28\left(\frac{FWD + \frac{t_d}{n_d}}{F}\right)^2 < 0.1$$

where F is the focal length of the lens.

4. A device as claimed in claim 3, wherein the refractive index of the lens satisfies the condition:

$$-0.05 < n - 2.49 + 2.79\left(\frac{FWD + \frac{t_d}{n_d}}{F}\right) - 2.28\left(\frac{FWD + \frac{t_d}{n_d}}{F}\right)^2 < 0.05$$

5. A device as claimed in claim 1, wherein the normalised power P of the surface of the lens arranged to face the optical record carrier satisfies the condition:

$$-0.2 < P < 0.15 \quad .$$

6. A device as claimed in claim 5, wherein the normalised power P satisfies the condition:

$$-0.15 < P < 0.1 \quad .$$

7. A device as claimed in claim 1, wherein the device satisfies at least one of the conditions of:

$$-0.1 < n - 2.49 + 2.79\left(\frac{FWD + \frac{t_d}{n_d}}{F}\right) - 2.28\left(\frac{FWD + \frac{t_d}{n_d}}{F}\right)^2 < 0.1$$

and

$$-0.2 < P < 0.15$$

where n is the refractive index of the lens, F is the focal length of the lens and P is the normalised power of the surface of the lens arranged to face the disc.

8. A device as claimed in claim 1, wherein the Abbe number of the material of the lens is greater than 40.

9. A device as claimed in claim 1, the device further comprising a detection system for converting radiation coming from the information layer to an information signal, and an information processing unit for error correction of the information signal.

10. A lens system comprising at least one lens for converging a radiation beam on an information layer of an optical record carrier, the information layer being covered by a transparent layer of thickness $t_d$ and refractive index $n_d$, the lens system being characterised in comprising a lens formed of a single material, the lens satisfying the condition:

$$0.8 < \frac{t}{1.18 - 2.28\left[FWD + \frac{t_d}{n_d}\right]} < 1.2$$

where t is the thickness of the lens, FWD is the free working distance between the lens and the carrier, where t, $t_d$ and FWD are expressed in millimetres, and where $FWD+t_d/n_d<0.51$.

11. A lens system as claimed in claim 10, wherein said single material is glass.

12. A lens system as claimed in claim 10, wherein said single material is plastic.

13. A method for manufacturing a lens system comprising at least one lens for converging a radiation beam on an information layer of an optical record carrier, the information layer being covered by a transparent layer of thickness $t_d$ and refractive index $n_d$, the method comprising the step of:

forming a lens of a single material, the lens satisfying the condition:

$$0.8 < \frac{t}{1.18 - 2.28\left[FWD + \frac{t_d}{n_d}\right]} < 1.2$$

where t is the thickness of the lens, FWD is the free working distance between the lens and the carrier, where t, $t_d$ and FWD are expressed in millimetres, and where $FWD+t_d/n_d<0.51$.

14. A method as claimed in claim 13, wherein a glass moulding process is utilised to form the lens.

15. A method of manufacturing an optical scanning device for scanning an information layer of an optical record carrier, the information layer being covered by a transparent layer of thickness $t_d$ and refractive index $n_d$, the method comprising the steps of:

providing a radiation source for generating a radiation beam;

providing a lens system for converging the radiation beam on the information layer, the lens system being characterised in comprising a lens formed of a single material, the lens satisfying the condition:

$$0.8 < \frac{t}{1.18 - 2.28\left[FWD + \frac{t_d}{n_d}\right]} < 1.2$$

where t is the thickness of the lens, FWD is the free working distance between the lens and the carrier, where t, $t_d$ and FWD are expressed in millimetres, and where $FWD+t_d/n_d<0.51$.